

IN THE CLAIMS

1. (currently amended) In a method controlling intake air humidification spraying apparatus, the apparatus comprising at least two spraying nozzles (1a, 1b, 1c, 1d) for spraying a liquid into the intake air, the method improvements characterized in that,

when an amount of the liquid to be supplied through the spraying nozzles increases, liquid flow passages are opened for more nozzles (1a, 1b, 1c, 1d) and/or the liquid flow is directed into a flow passage leading to one of the spraying nozzles that permits a larger liquid flow per unit of time than another of the spraying nozzles, and when an amount of the liquid to be supplied through the nozzles decreases, liquid flow channels are closed at least for one of the spraying nozzles (1a, 1b, 1c, 1d) and/or the liquid flow is directed to one of the spraying nozzles that permits a smaller liquid flow per unit of time than another of the spraying nozzles, and

a substantially constant amount of liquid per unit of time is fed into a supply pipe (4) for the spraying nozzles and at least a portion of the liquid quantity supplied that is not directed to the nozzles is conveyed into a return pipe (5).

2. (canceled)

3 (currently amended) Method according to claim 1, characterized in that a constant pressure is maintained in the supply pipe (4), regardless of the number of the spraying nozzles spraying.

4. (currently amended) Method according to claim 12 characterized in that the k-value (resistance) of at least one of the channels leading into the return pipe (5) is adjusted to make it correspond to the k-value (resistance) of the spraying nozzles in closed state.
5. (currently amended) Method according to claim 12, characterized in that the value of the sum of the activated (open) k-values is kept substantially constant.
6. (currently amended) Method according to claim 12, characterized in that the liquid to be fed into the return line is conveyed through at least one return channel (3a, 3b, 3c, 3d) into the return pipe.
7. (previously presented) Method according to claim 6, characterized in that the return channel (3a, 3b, 3c, 3d) is provided with at least one valve element (A2, B2, C2, D2), which is controlled on the basis of impulses given by the control system.
8. (previously presented) Method according to claim 6, characterized in that, in the at least one return channel (3a, 3b, 3c, 3d), a throttle element (17a, 17b, 17c, 17d) or equivalent having a k-value adapted to correspond to the k-value of the at least one closed one of the spraying nozzles is used.
9. (previously presented) Method according to claim 1, characterized in that the amount of liquid to be supplied through the spraying nozzles (1a, 1b, 1c, 1d) is adjusted as a function of the engine load.

10. (previously presented) Method according to claim 1, characterized in that a liquid mist is sprayed through the spraying nozzles (1a, 1b, 1c, 1d).

11. (previously presented) Method according to claim 1, characterized in that the liquid mist is injected at a pressure of 10-300 bar.

12. (previously presented) Method according to claim 1, characterized in that the maximum droplet size of the liquid mist injected is typically 200 micrometers.

13. (previously presented) Method according to claim 1, characterized in that a second medium is conveyed to the spraying nozzles when it is in closed state to prevent clogging of the spraying nozzle.

14. (currently amended) In apparatus supplying a liquid into intake air of an engine, the improvements comprising:

at least two spraying nozzles for spraying a liquid as a mist into a duct for the intake air;

at least two feed channels (2a, 2b, 2c, 2d) with valve elements (A1, B1, C1, D1) respectively leading to the spraying nozzles;

a control system giving impulses on the basis of which the valve elements are opened and closed; and

liquid supply means (4, 6, 10) for supplying the liquid into the feed channels (2a, 2b, 2c, 2d); and

an outlet pipe (5) and at least one outlet channel (3a, 3b, 3c, 3d), through which a connection to the outlet pipe from the supply pipe (4) leading to the nozzles can be opened and closed.

15. (canceled)

16. (previously presented) Apparatus according to claim 14, characterized in that the outlet channel (3a, 3b, 3c, 3d) is provided with a valve element (A2, B2, C2, D2) arranged to close when the corresponding valve element (A1, B1, C1, D1) in the feed channel (2a, 2b, 2c, 2d) leading to the nozzle opens and to open when the valve element in the corresponding feed channel leading to the nozzle closes.

17. (previously presented) Apparatus according to claim 14, characterized in that the apparatus comprises means for keeping the flow resistance (sum of k-values) constant.

18. (previously presented) Apparatus according to claim 14, characterized in that the apparatus comprises a number of feed channels (2a, 2b, 2c, 2d) leading to the nozzles and a corresponding number of return channels (3a, 3b, 3c, 3d) as well as valve elements for each feed channel and return channel, each feed channel - return channel pair being controlled together so that when the feed channel opens, the return channel closes and vice versa.

19. (previously presented) Apparatus according to claim 14, characterized in that the return channels are provided with a throttle element (3a', 3b', 3c', 3d') or equivalent.

20. (previously presented) Apparatus according to claim 14, characterized in that the liquid supply means comprise a liquid source (10) and a pump (6).

21. (previously presented) Apparatus according to claim 14, characterized in that the control system has been adapted to control the apparatus on the basis of engine load.

22. (previously presented) Apparatus according to claim 14, characterized in that the apparatus comprises means (33) for regulating the temperature of the first pressure medium.

23. (previously presented) Apparatus according to claim 14, characterized in that the apparatus comprises means (20, 21, 25a, 25b, 25c, 25d) for conveying a second pressure medium to a nozzle (1a, 1b, 1c, 1d) whose feed channel is in closed state, to prevent clogging of the nozzle.

24. (previously presented) Apparatus according to claim 14, characterized in that it comprises means (34, 36, 14) for filtering at least the first pressure medium.

25. (new) In apparatus supplying a liquid into intake air of an engine, the improvements comprising:

at least two spraying nozzles for spraying a liquid as a mist into a duct for the intake air;

at least two feed channels (2a, 2b, 2c, 2d) with valve elements (A1, B1, C1, D1) respectively leading to the spraying nozzles;

a control system giving impulses on the basis of which the valve elements are opened and closed;

liquid supply means (4, 6, 10) for supplying the liquid into the feed channels (2a, 2b, 2c, 2d); and

an outlet channel (3a, 3b, 3c, 3d) is provided with a valve element (A2, B2, C2, D2) arranged to close when the corresponding valve element (A1, B1, C1, D1) in the feed channel (2a, 2b, 2c, 2d) leading to the nozzle opens and to open when the valve element in the corresponding feed channel leading to the nozzle closes.

26. (previously presented) Apparatus according to claim 25, characterized in that the apparatus comprises means for keeping the flow resistance (sum of k-values) constant.

27. (previously presented) Apparatus according to claim 25, characterized in that the apparatus comprises a number of feed channels (2a, 2b, 2c, 2d) leading to the nozzles and a corresponding number of return channels (3a, 3b, 3c, 3d) as well as valve elements for each feed channel and return channel, each feed channel - return channel pair being controlled together so that when the feed channel opens, the return channel closes and vice versa.

28. (previously presented) Apparatus according to claim 25, characterized in that the return channels are provided with a throttle element (3a', 3b', 3c', 3d') or equivalent.

29. (previously presented) Apparatus according to claim 25, characterized in that the liquid supply means comprise a liquid source (10) and a pump (6).

30. (previously presented) Apparatus according to claim 25, characterized in that the control system has been adapted to control the apparatus on the basis of engine load.

31. (previously presented) Apparatus according to claim 25, characterized in that the apparatus comprises means (33) for regulating the temperature of the first pressure medium.

32. (previously presented) Apparatus according to claim 25, characterized in that the apparatus comprises means (20, 21, 25a, 25b, 25c, 25d) for conveying a second pressure medium to a nozzle (1a, 1b, 1c, 1d) whose feed channel is in closed state, to prevent clogging of the nozzle.

33. (previously presented) Apparatus according to claim 25, characterized in that it comprises means (34, 36, 14) for filtering at least the first pressure medium.